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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/614,848

07/07/2003

Hiroyuki Hebiguchi

ALPSP127

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22434

7590

12/01/2004

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EXAMINER

AKKAPEDDI, PRASAD R

ART UNIT

PAPER NUMBER

2871

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/614,848	Applicant(s) HEBIGUCHI, HIROYUKI	
	Examiner Prasad R Akkapeddi	Art Unit 2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>07/07/2003</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1, 5-8 and 12-14 are rejected under 35 U.S.C. 102(a) as being anticipated by Satake et al. (Satake) (U.S. Patent No. 6,426,787).

As to claims 1 and 8: Satake discloses a liquid crystal display device with a liquid crystal layer (117) held between two substrates (110, 119), pixel electrodes (113), switching elements (111). Satake also discloses a diffuse reflector (538, 539 and 540) doubling as a display electrode (pixel electrode) and switching elements (543) connected to the diffuse reflector (Fig. 5B).

The diffuse reflector comprises a specular reflector (aluminum film, col. 11, line 35) and since it is an aluminum film, it has electrical conductivity and a light diffusion portion made of a transparent dielectric (541) arranged on the specular reflector. In Fig. 5C, Satake shows that the light diffusion portion has an uneven configuration on the surface in the side facing the liquid crystal (convex-concave portions as described in col. 11, lines 10-12).

As to claims 5 and 12: Satake discloses that the thickness of the light diffusion portion is of the order of ($\lambda/4=0.1$ to 0.2 micrometers) in a visible

light region (col. 11, lines 57-59) and hence it is less than 3 micrometers as recited.

As to claims 6 and 13: Satake discloses that the dielectric film is made from polyimide film (col. 11, line 45) and an orientation or an alignment film (col. 11, line 12).

As to claims 7 and 14: Satake discloses that the diffuses reflector can be made from ITO (col. 11, lines 50-52), which is a transparent conductive material and hence will be a translector.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2-4 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Satake in view of Tsuda et al. (Tsuda) (U.S. Patent No. 6,097,458).

As to claims 2 and 9: Satake teaches that the diffused reflector consists of concave and convex portions. However, these convex and concave portions are continuously connected and are not comprised of number of projections arranged at a distance from each other as recited in the instant claims.

Tsuda in disclosing a reflector and a reflective liquid crystal display incorporating the reflector, discloses a number of projections (14) on the diffuse reflector (15) that are arranged from each other (Figs. 1F and 4).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the discrete projections as disclosed by Tsuda to the display device of Satake for a display device that provides excellent reflection characteristics and provides a bright display of images particularly in a viewing angle of a user inputting data with an input pen (col. 4, lines 32-42).

As to claims 3,4 and 10,11: Satake discloses that the refractive index of the polyimide dielectric layer is about 1.5 (col. 11, lines 45-46). The refractive index and the dielectric constant of a material are related by the equation $\text{dielectric constant} = \text{square root of index of refraction}$. Hence the recitations in claims 3, 4 and 10, 11 as they apply to dielectric constant and refractive index are interchangeable.

However, Satake does not disclose the refractive index or the dielectric constant of the liquid crystal material.

Tsuda discloses that the refractive index of the liquid crystal material is about 1.5 (col. 9, lines 48-50). Hence the refractive index of the dielectric material as disclosed by Satake and the refractive index of the liquid crystal material as disclosed by Tsuda is similar. Since the refractive indices of the materials match, light will pass through the liquid crystal material and the dielectric film without any boundary refractory effects resulting in a bright display. When the refractive index (dielectric constant) of the liquid crystal material changes when no voltage is applied there will be a refractive index mismatch

between the liquid crystal material and the dielectric film causing a loss of light at the interface resulting in a poorer display. Hence for bright displays, the refractive index and the dielectric constant of the two materials should be closer to each other.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the liquid crystal material having a refractive index of 1.5 as disclosed by Tsuda to the display device of Satake for a device that provides bright display of images (col. 4, lines 32-42).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prasad R Akkapeddi whose telephone number is 571-272-2285. The examiner can normally be reached on 7:00AM to 5:30PM M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on 571-272-2293. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Prasad R Akkapeddi, Ph.D

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Examiner
Art Unit 2871


TARIFUR R. CHOWDHURY
PRIMARY EXAMINER